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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,646

06/26/2008

Susumu Noda

060721

2855

7590

09/01/2010

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EXAMINER

NGUYEN, TU T

ART UNIT

PAPER NUMBER

2886

MAIL DATE

DELIVERY MODE

09/01/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/593,646	<b>Applicant(s)</b> NODA ET AL.	
	<b>Examiner</b> TU T. NGUYEN	<b>Art Unit</b> 2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 25-29 is/are pending in the application.
- 4a) Of the above claim(s) 20-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,10-18 and 25-29 is/are rejected.
- 7) ☒ Claim(s) 3-9 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____  |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :10/27/09, 05/06/09, 12/03/08, 09/21/06 .

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Species I (claims 2-19, 26-29) in the reply filed on 08/06/2010 is acknowledged. Claims 1-19, 25-29 will be examined.

### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 03/24/2004. It is noted, however, that applicant has not filed a certified copy of the JAPAN 2004-087666 application as required by 35 U.S.C. 119(b).

### ***Abstract***

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

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The abstract of this application should be limited to a single paragraph on a separate sheet within the range of 50 to 150 words.

### **Claim Objections**

Claim 18 is objected to because of the following informalities:

The word “resistors” should be changed to “resonator”.

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 10-18, 25-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Letant et al (2002/0191884).

With respect to claims 1,25, Letant discloses a sensor for determining a characteristic of a target substance (abstract), said sensor comprising: an electromagnetic wave source 30 (fig 6) of supplying an electromagnetic wave 32 (fig 6); a photonic sensor element having a photonic crystalline structure 26 (fig 6) and configured to include: a sensor waveguide 2 (fig 1A) for introducing said electromagnetic wave, and a sensing resonator electromagnetically 34 (fig 6) (see fig 2 for resonant frequency) coupled to said sensor waveguide for resonating the electromagnetic wave of a specific wavelength (paragraph [0049]) , said sensing

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resonator being exposed to an atmosphere including the target substance so as to vary a characteristic of said electromagnetic wave emitted from said sensing resonator (paragraph [0007]); and a detector 36 (fig 6) configured to receive the electromagnetic wave emitted from said sensing resonator to recognize an intensity variation of the electromagnetic wave 40 (fig 6).

Letant does not explicitly disclose issuing a signal indicative of a characteristic of said target substance. However, it would have been obvious a design choice to modify Letant to issue the signal as claimed to read the result easier.

With respect to claim 2, Letant discloses determining a density (concentration) of said target substance based upon a characteristic variation of said electromagnetic (paragraph [0007], last sentence).

With respect to claim 10, Letant discloses the electromagnetic wave source supplies the electromagnetic wave including different wavelengths so that said sensing resonator allows the resonance of the electromagnetic wave of said specific wavelength which is determined by said target substance, said detector being configured to select the electromagnetic wave of said specific wavelength emitted from said sensing resonator and calculate the density of the target substance based upon the intensity of thus selected electromagnetic wave 40 (fig 6).

With respect to claim 11, Letant discloses sensing the intensity if the wavelength (paragraph [0049]).

With respect to claims 12,26, Letant discloses a plurality of through pores for detecting at least one biological target (paragraph [0007]). Letant does not disclose the sensing waveguide being cooperative with said sensing resonator and said detector to define a single detection unit. However, it would have been obvious to modify Letant by cooperating all unit into one single detection to reduce the system noise.

With respect to claims 13-16, 27-29, Letant discloses using a plurality of resonators 18 (fig 6). However, Letant does not explicitly disclose the claimed resonator. It would have been obvious to modify Letant with the claimed resonator as claimed to detect different characteristics of the sample at a same time.

With respect to claim 17, Letant discloses determining the concentration of the sample by detecting the intensity and the wavelength of light (paragraph [0007]) and the element 18 (fig 6) could be considered as the claimed reactor.

With respect to claim 18, Letant discloses two said sensing resistors 18 (fig 6) being formed in said photonic sensor element 28 (fig 6) and are electromagnetically coupled to each other, said sensing resonators being configured to resonate said electromagnetic wave of said specific wavelength, a reactor is provided in an energy

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coupling path between said two sensing resonator, said reactor being configured to react with said target substance to alter an effective waveguide length of said energy coupling path to thereby vary the intensity of the electromagnetic wave emitted from said sensing resonators, said detector being configured to calculate the density of the target substance based upon the variation of the intensity of the electromagnetic wave (paragraph [0007]).

***Allowable Subject Matter***

Claims 3-9,19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claim 3, the prior art of record taken, alone or in combination, fail to disclose or render obvious a sensor comprising: a reference waveguide; and a reference resonator, said reference waveguide introducing said electromagnetic wave from said source, said reference resonator being electromagnetically coupled to said reference waveguide to resonate the introduced electromagnetic waver at said specific wavelength, said reference resonator being concealed from said target substance, said detector comprising: an output intensity meter providing a detection signal indicating an intensity of the electromagnetic wave of said specific wavelength emitted from said sensing resonator; a reference intensity meter providing a reference signal indicating an intensity of the electromagnetic wave of said specific wavelength emitted from said reference resonator; and a density meter comparing said detection signal with said

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reference signal so as to obtain an attenuation of the electromagnetic wave of said specific wavelength, thereby calculating the density of said target substance based upon said attenuation, in combination with all the limitations in the base claims.

With respect to claim 19, the prior art of record taken, alone or in combination, fail to disclose or render obvious a sensor comprising: a first photonic crystalline structure and a second photonic crystalline structure which are different from each other and are arranged in a side-by-side relation within a two-dimensional array, said sensor waveguide is composed of an input waveguide and an output waveguide which extend in parallel with each other, each of said input and output waveguides extending over the full length of said first photonic crystalline structure into said second photonic crystalline structure, said sensing resonator being formed in said first crystalline structure between said input waveguide and said output waveguide, said input waveguide defining at its one lengthwise end away from said second crystalline structure an input port for receiving said electromagnetic wave from said source, said output guide defining at its one lengthwise end away from said second crystalline structure an output port for emitting the electromagnetic wave of said specific wavelength resonating at said sensing resonator, said input waveguide being formed with an input reflector at the interface between the first and second crystalline structures for reflecting the electromagnetic wave of said specific wavelength towards said output port, said output waveguide being formed with an output reflector at the interface between the first and second crystalline structures for reflecting the electromagnetic wave of said specific

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wavelength towards said input port, each of said input waveguide and said output waveguide being provided with a reactor at a portion bridging across said first and second crystalline structures, said reactor being configured to react with said target substance to alter reflection efficiency at said input reflector and said output reflector, thereby varying the intensity of the electromagnetic wave received at said target detector, and said detector being configured to calculate the density of the target substance based upon the variation of the intensity of the electromagnetic wave, in combination with all the limitations in the base claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TU T. NGUYEN whose telephone number is (571)272-2424. The examiner can normally be reached on T-F 7:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur Chowdhury can be reached on (571) 272-2800 Ext. 86. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tu T. Nguyen/  
Primary Examiner, Art Unit 2886

08/29/2010